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(54) [Title of the Invention]
STEEL MEMBER CUTTING MACHINE

(57) [Abstract]
[Problem to be Solved]
To provide a steel member cutting machine
that can be used for a long time while
requiring less time for repairs.

[Solution]
A front block 20 is detachably fixed to the
front end of a fixed jaw 8 by fastening with
bolts and nuts. A front edge blade 28 is
detachably fixed to the front end of a
movable jaw 9 that opens from and shuts to
the fixed jaw 8, by fastening with bolts. The

front block 20 and the front edge blade 28
can be manufactured of a rigid material, so
that wear can be prevented from occurring
to the front ends of the fixed jaw 8 and the
movable jaw 9. The front block 20 and the
front edge blade 28 can be quickly replaced
with new ones when wear has occurred to
the front block 20 and the front edge blade

28, allowing shearing and crushing operations to continue.

[Claims]

[Claim 1]

A steel member cutting machine characterized by the fact that:

it possesses a fixed jaw and a movable jaw that opens from and shuts to the fixed jaw;

the center section of the engagement surfaces of the jaws is shaped to form an indentation; and

a detachable front block that is fixed to the front end of said fixed jaw which shears and crushes along with said movable jaw, in a cutting machine that closes said movable jaw and shears steel members inserted between the jaws with a shear blade that is mounted on the movable jaw and fixed jaw.

[Claim 2]

A steel member cutting machine in Claim 1 characterized by the fact that said fixed jaw consists of a shear blade and a guide blade that is correspondingly mounted so that it creates the spacing between itself and the shear blade for the movable jaw to move into, and that a front block is detachably fixed in between the front ends of both blades.

[Claim 3]

A steel member cutting machine in Claim 2 characterized by the fact that an engagement recess is formed on the inner surface of the front ends of said shear blade and guide blade so that the front block can be freely inserted and pulled out toward the movable jaw.

[Claim 4]

A steel member cutting machine in Claim 1 characterized by the fact that two front edge blades are detachably fixed to both sides of the front end of said jaw, and that a guard blade that covers the inner surface of the front end of the movable jaw is mounted on each blade.

[Claim 5]

A steel member cutting machine characterized by having an engagement recess where the front edge blade engages with both sides of the front end of said movable jaw.

[Detailed Explanation of the Invention]

[0001]

[Technical Field of the Invention] This invention relates to a steel member cutting machine used in wrecking civil engineering operations.

[0002]

[Prior Art]

What has been commonly seen from the past is to attach a steel member cutting machine to the front end of the arm of work machines such as the power shovel, and to wreck steel-reinforced, steel framed buildings with this steel member cutting machine.

[0003]

As an example of said steel member cutting machine, one that is disclosed in Utility Model Disclosure H7-9970 is known. This steel member cutting machine possesses a fixed jaw and a movable jaw that is mounted so that it can be freely opened or closed versus the fixed jaw, and is designed to shear steel members of steel frames and steel reinforcements that are inserted between both jaws with a shear blade mounted on the movable jaw and the fixed jaw. To prevent the steel members from escaping during the shearing, the center of the engagement surface between the fixed jaw and movable jaw is shaped to have an indentation.

[0004]

[The Problems that the Invention is to Solve]

Incidentally, the steel members to be sheared by said steel member cutting machine are not limited to small ones such as steel reinforcements that fit in between the fixed jaw and movable jaw, and can also include large ones that do not fit between the pair of jaws. In this case, the fixed jaw and movable jaw do the shearing under the condition in which the inner surface of the front end makes a contact with a steel member, resulting in faster wear of the front ends of the fixed jaw and movable jaw.

[0005]

Also, other than the steel shearing, the steel member cutting machine is frequently used to crush concrete pieces. In such cases, the front end of each jaw wears out quickly due to the fact that the front ends of the pair of jaw destroy the concrete pieces.

[0006]

In the steel member cutting machine of the prior art, it was difficult to manufacture the front ends of the fixed jaw and movable jaw with a rigid material due to the fact that they were integrated with the large fixed jaw and movable jaw. In addition, welding was required to repair the wear, and the welding required a procedure of pre-heating of the welded section, welding, and cooling of the welded section, necessitating 2 to 3 days for repair.

[0007]

The issue for this invention is to provide a steel member cutting machine that can be used for a long time while requiring less time for repairing.

[0008]

[Solution]

In order to solve the above-mentioned problem, in Claim 1, in a cutting machine that closes said movable jaw and shears steel members inserted between the jaws with a shear blade that is mounted on the movable jaw and fixed jaw, the steel member cutting machine is formed to possess a fixed jaw and a movable jaw that opens from and shuts to the fixed jaw, the center section of the engagement surfaces of the jaws being shaped to form an indentation, and with a detachable front block that is fixed to the front end of said fixed jaw which shears and crushes along with said movable jaw, so that the worn front block can be replaced with a new front block, thus prolonging the life of the fixed jaw.

[0009]

Also, in Claim 2, the two front edge blades are detachably fixed to both sides of the front end of the movable jaw of Claim 1, and a guard blade that covers the inner surface of the front end of the movable jaw is mounted on each blade, so that the pair of front edge blades prevent the wear of the

front end of the movable jaw. When the front edge blade is worn, it can be replaced with a new front edge blade, thus prolonging the life of the movable jaw.

[0010]

[Embodiments]

Hereafter, we shall explain the embodiments of this invention using drawings.

[0011]

As indicated in Figure 1, the steel member cutting machine possesses the bracket 1 and the frame 2 that is rotatably connected to the bracket 1, and the bracket 1 is fixed to the front end of the arm 3 of a power shovel and the like via the pin 4.

[0012]

Also, the link 5 is detachably connected to the bracket 1 via the pin 6, and the bracket 1 oscillates with the pin 4 as the center by shifting the above-mentioned link 5 with a cylinder not indicated on the figure.

[0013]

The frame 2 has a pair of side panels 7, and the fixed jaw 8 and the movable jaw 9 are fixed in between the front ends of said side panels 7.

[0014]

The fixed jaw 8 is fixed to the side panels 7 with two axles 10, 11. On the other hand, the movable jaw 9 is supported, free to oscillate, with the above-mentioned axle 11 as the center, and is opened and shut by the actuation of the hydraulic cylinder 12 that is connected to the rear end.

[0015]

Here, the hydraulic cylinder 12 is supported, free to oscillate by the side panels 7 via the trunnion axle 13.

[0016]

As indicated in Figure 2, the fixed jaw 8 possesses the shear blade 14 and the guide blade 15, and a space is provided in between the blades 14, 15 so that said movable jaw 9 can move in.

[0017]

The engagement surface 16 for the movable jaw 9 of the shear blade 14 has inclines 16a and 16b that slope in reciprocal directions with an indentation in the center section, and a shear blade 17 is fixed along the side edge of each of the inclines 16a, 16b.

[0018]

The surface of the guide blade 15 facing the movable jaw 9 is shaped to have the arched surface 18, and a step is provided for the engagement surface 16 of the shear blade 14, as shown in Figure 6.

[0019]

As shown in Figures 2 and 3, an engagement recess 19 is formed on the inner surface of the front ends of the shear blade 14 and the guide blade 15. The front block 20 is engaged to the engagement recess 19, and the spacer 21 for space adjustment is engaged to both sides of the front block 20, both being free to insert and to pull out and detachably fixed to both blades 14, 15 with multiple bolts 22 and nuts 23.

[0020]

The front block 20 is formed with a rigid material with high wear resistance, and its inner surface has the guide groove 24 that allows the front end of the movable jaw 9 to move in.

[0021]

The engagement surface 25 of said movable jaw 9 facing the fixed jaw 8 consists of two inclines 25a, 25b sloping in reciprocal directions, and the shear blade 26 is fixed along the side edge of each incline 25a, 25b.

[0022]

Also, both sides of the front end of the movable 9 have the engagement recess 27, and the front edge blade 28 is engaged to each engagement recess 27. The guard blade 29 that covers the inner surface of the front end of the movable 9 is fixed to the front edge blade 28.

[0023]

As shown in Figure 4, multiple insertion holes 30 are formed on one side of the pair of the front edge blades 28 and the front end of the movable jaw 9. The bolt 31 that is inserted in each of the insertion holes 30 is screwed into the screw hole 32 of the other front edge blade 28. The pair of front edge blades 28 are detachably fixed to the movable jaw 9 by the fastening of the bolt 31.

[0024]

When the hydraulic cylinder 12 as shown in Figure 1 is activated, the movable jaw 9

opens and shuts with the axle 11 as the center. When the movable jaw 9 shuts, the movable jaw 9 moves in between the shear blade 14 and the guide blade 15, as shown in Figures 5 and 6.

[0025]

Because of this, by shutting the movable jaw 9 after positioning a steel member such as steel reinforcements and the like between the fixed jaw 8 and the movable jaw 9, it becomes possible to shear the steel member with the shear blades 17, 26.

[0026]

Also, by shutting the movable jaw 9 after a portion of such crushable materials as a concrete wall and the like is positioned between the fixed jaw 8 and the movable jaw 9, it becomes possible to crush the crushable materials, and to shear with the shear blades 17, 26.

[0027]

When cutting something large such as a steel plate, the front ends of the fixed jaw 8 and the movable jaw 9 make a contact with the object to be sheared. When this happens, due to the fact that the front block 20 is attached to the front end of the fixed jaw 8, and that the front edge blade 28 is attached to the movable jaw 8 on the other hand, the fixed jaw 8 and the movable jaw 9 themselves do not make a contact with the object to be sheared, and the front block 20 and the front edge blade 28 make a contact with the object to be sheared.

[0028]

Because of this, the front block 20 and the front edge blade 28 wear out by the repeated shearing of sheared objects such as a steel plate. When the crushing effect is reduced due to this wear, the front block 20 and the front edge blade 28 are removed and replaced with new ones.

[0029]

As shown in Figure 3, by having the engagement recess 19 that engages with both sides of the front block 20 on the inner surface of the front end of the shear blade 14 and the guide blade 15, the load of the crushable object when cutting is received by the area wall of the engagement recess 19. Thus, this prevents the loading on the bolt

22 that fixes the front block 20, and the damage to the bolt 22. Also, it becomes possible to fix the front block 20 with fewer bolts 22.

[0030]

Also, as shown in Figure 4, by having the engagement recess 27 on both sides of the front end of the movable jaw 9, and by also fixing the guard blade 29 onto the front edge blade 28, it becomes possible to receive the cutting load on the inner surface of the movable jaw 9 or the inner area of the engagement recess 27. Thus, there will be no load working on the bolt 31, preventing the damage to the bolt 31, as well as enabling the reduction of the number of the bolts 31.

[0031]

[Effects of the Invention]

This invention thus constituted as above shall have the following effects.

[0032]

(1) By detachably fixing the front block that shears along with the movable jaw to the front end of the fixed jaw, it becomes possible to manufacture the front block with a rigid material. This front block can prevent the wear of the front end of the fixed jaw, thus allowing for a long time use.

[0033]

Also, a quick repair becomes possible in the case of the repair of the wear of the front block because all that is required is to replace it with a new front block.

[0034]

(2) By having an engagement recess that supports the front block on the inner surface of the front end of the shear blade and guide blade, free to insert and pull out, it becomes possible to receive the load that works on the front block when shearing or crushing on the inner area of the engagement recess. This prevents the load on the attachment axle such as that of the bolts that attach the front block and the damage of the attachment axle.

[0035]

(3) By detachably fixing the front edge blade to the front end of the movable jaw, it becomes possible to manufacture the front edge blade with a rigid material, thus

preventing the wear of the front end of the movable jaw. Also, the repair of the wear of the movable jaw only involves a replacement with a new one, making the repair easy and quick.

[0036]

(4) By having an engagement recess on the movable jaw that engages the front edge blade, it becomes possible to receive the load on the front edge blade in the inner area of the engagement recess, thus preventing the damage to the attachment axle of the bolt and the like that attaches the front edge blade.

[Brief Explanation of the Drawings]

[Figure 1] A partially cut-out front view of the steel member cutting machine according to this invention.

[Figure 2] An exploded perspective view showing the fixed jaw and movable jaw of the same.

[Figure 3] The cross-section view along the III-III line of Figure 1.

[Figure 4] The cross-section view along the IV-IV line of Figure 1.

[Figure 5] A partially cut-out front view that shows the condition in which the movable jaw has shut in the above.

[Figure 6] The cross-section view along the VI-VI line of Figure 5.

[Explanation of Reference Numerals]

- 8. Fixed jaw
- 9. Movable jaw
- 14. Shear blade
- 15. Guide blade
- 16. Engagement surface
- 17. Shear blade
- 19. Engagement recess
- 20. Front block
- 25. Engagement surface
- 26. Shear blade
- 27. Engagement recess
- 28. Front edge blade
- 29. Guard blade